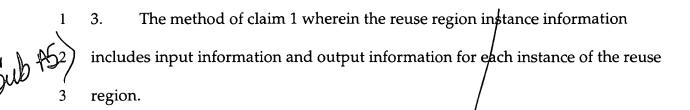
CLAIMS

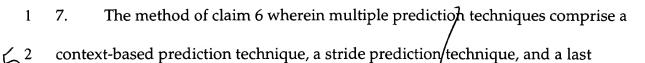
What is claimed is:

Sub H5 1. A method for speculatively reusing regions of code, the method 2 comprising:

- 3 identifying a reuse region and a data input to the reuse region;
- 4 determining whether a data output of the reuse region is contained within
- 5 reuse region instance information perlaining to a plurality of instances of the
- 6 reuse region; and
- 7 when the data output is not contained within the reuse region instance
- 8 information, predicting the data output of the reuse region based on the reuse
- 9 region instance information.
- 1 2. The method of claim 1 wherein determining whether the reuse region
- 2 instance information contains a data output comprises:
- determining whether the data input to the reuse region matches any input
- 4 information within the reuse region instance information; and
- 5 when the data input matches input information within the plurality of
- 6 instances, determining whether the reuse region is identified by a normal reuse
- 7 instruction..



- 1 4. The method of claim 3 wherein the reuse region instance information
- 2 further includes a plurality of confidence counters for each live-out register of the
- 3 reuse region, each of the plurality of confidence counters being associated with a
- 4 certain prediction technique.
- 1 5. The method of claim 1 wherein predicting the data output further
- 2 comprises: predicting a current set/of live-out registers of the reuse
- 3 region; and
- 4 predicting an output value for each live-out register within the current set
- of live-out registers using at least one prediction technique and a prediction list
- 6 maintained in the buffer.
- 1 6. The method of claim 5 wherein predicting an output value for each live-
- 2 out register further comprises selecting the at least one prediction technique from
- 3 multiple prediction techniques based upon a plurality of confidence counters
- 4 associated with the live-out register, each of the plurality of confidence counters
- 5 corresponding to a certain prediction technique.

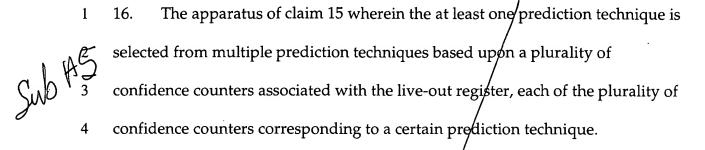


value prediction technique.

- 1 8. An apparatus comprising:
- 2 a buffer to hold reuse region instance information pertaining to a plurality
- 3 of instances of a reuse region; and
- 4 a processing core to predict a data output of the reuse region based on the
- 5 reuse region instance information, and to speculatively execute instructions
- 6 using the predicted data output of the reuse region.
- 1 9. The apparatus of claim 8 wherein the processing core is configured to
- 2 determine whether a data output of the reuse region is to be predicted.
- 1 10. The apparatus of claim 9 wherein the processing core is further configured
- 2 to search the buffer for a matching instance and to determine whether the reuse
- 3 region is identified by a normal reuse instruction
- 1 11. The apparatus of claim 8 wherein the reuse region instance information
- 2 includes input information and output information for each instance of the reuse
- 3 region.

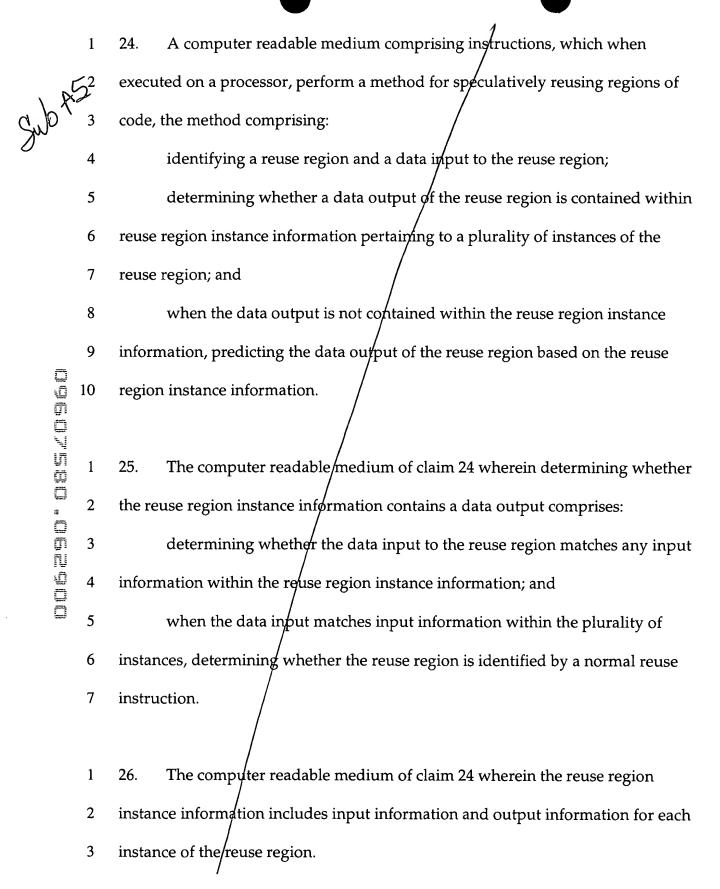


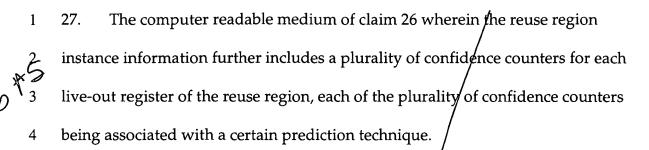
- 1 12. The apparatus of claim 11 wherein the reuse region instance information
 2 further includes a plurality of confidence counters for each live-out register of the
- reuse region, each of the plurality of confidence counters being associated with a
- 4 certain prediction technique.
- 1 13. The apparatus of claim 8 wherein the buffer includes a prediction list
- 2 having a plurality of pointers to reuse region instances held in the buffer, a
- 3 pointer to the most currently used instance being located on the top of the
- 4 prediction list and a pointer to the least currently used instance being located at
- 5 the bottom of the prediction list.
- 1 14. The apparatus of claim 8 wherein the buffer includes a value prediction
- 2 table having an entry that includes a predicted output value, the predicted
- 3 output value being located using an index.
- 1 15. The apparatus of claim 8 wherein the processing core is further configured
- 2 to predict a current set of he reuse region, and to predict an
- 3 output value for each live-out register within the current set of live-out registers
- 4 using at least one prediction technique and a prediction list maintained in the
- 5 buffer.



- 1 17. The apparatus of claim 16 wherein multiple prediction techniques
- 2 comprise a context-based prediction technique, a stride prediction technique, and
- a last value prediction technique and wherein the prediction list points to
- 4 the most recently used instance when the last value prediction technique
- 5 is used,
- 6 two most recently used instandes when the stride prediction technique is
- 7 used, and
- 8 instances associated with a corresponding live-out register when the
- 9 context-based prediction technique is used, the associated instances being used
- to calculate an index pointing to a predicted output value in a value prediction
- 11 table maintained in the buffer.
- 1 18. A system comprising:
- 2 a memory to store regions of code; and
- a processor, coupled to the memory, to identify a reuse region in the
- 4 regions of code, to determine whether a data output of the reuse region is
- 5 contained within reuse region instance information pertaining to a plurality of

- 6 instances of the reuse region, and when the data output is not contained within
- the reuse region instance information, to predict the data output of the reuse region based on the reuse region instance information.
- 1 19. The system of claim 18 wherein the processor comprises a buffer to store
- 2 the reuse region instance information.
- 1 20. The system of claim 19 wherein the reuse region instance information
- 2 includes input information and output information for each instance of the reuse
- 3 region.
- 1 21. The system of claim 19 wherein the reuse region instance information
- 2 includes a plurality of confidence counters for each live-out register of the reuse
- 3 region, each of the plurality of confidence counters being associated with a
- 4 certain prediction technique.
- 1 22. The system of claim 19 wherein the buffer includes a prediction list having
- 2 a plurality of pointers to reuse region instances held in the buffer.
- 1 23. The system of claim 19 wherein the buffer includes a value prediction
- 2 table having an entry that includes a predicted output value, the predicted
- 3 output value being located using an index.





- 1 28. The computer readable medium of claim 24/wherein predicting the data
- 2 output further comprises:
- 3 predicting a current set of live-out registers of the reuse region; and
- 4 predicting an output value for each live-out register within the current set
- of live-out registers using at least one prediction technique and a prediction list
- 6 maintained in the buffer.
- 1 29. The computer readable medium of claim 28 wherein predicting an output
- 2 value for each live-out register further comprises selecting the at least one
- 3 prediction technique from multiple/prediction techniques based upon a plurality
- 4 of confidence counters associated with the live-out register, each of the plurality
- of confidence counters corresponding to a certain prediction technique.
- 1 30. The computer readable medium of claim 29 wherein multiple prediction
- 2 techniques comprise a context-based prediction technique, a stride prediction
- 3 technique, and a last value/prediction technique.